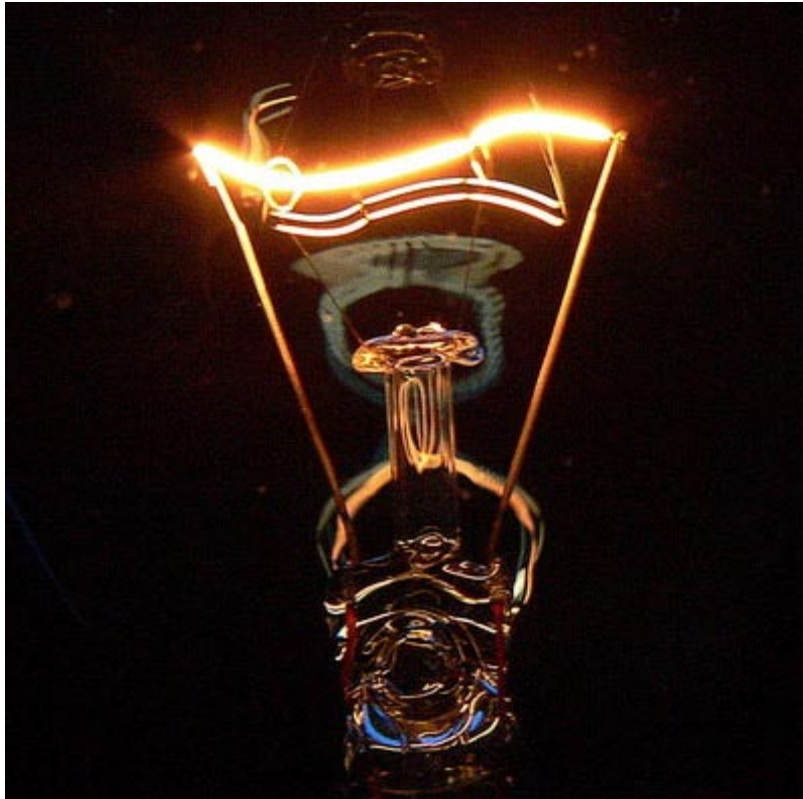


Short Circuits

NCSO Sample Event
2010 Elementary Tournament



STATION 1

Look at the sample circuit shown here.

1. Identify which part is the energy conductor?
 - a. Battery Pack
 - b. Motor
 - c. Wires
 - d. Wooden Spool

2. Identify which part is the energy source?
 - a. Battery Pack
 - b. Motor
 - c. Wires
 - d. All of the above

3. Identify which part is the energy receiver?
 - a. Battery Pack
 - b. Motor
 - c. Wires
 - d. All of the above

4. This circuit is:
 - a. Closed
 - b. Open

(NCSCoS S4.3.03)

STATION 2

You will need a balloon and some Styrofoam peanuts.

1. When you rub this balloon on your head, it creates:
 - a. Electricity
 - b. Static
 - c. Tiny lightning bolts
 - d. All of the above

2. Rub the balloon on your head or shirt. Now hold it over the Styrofoam peanuts. What happens?

3. Keep holding the balloon. After a few moments, what happens?

4. Why did this happen?
 - a. The peanuts got tired of holding on
 - b. The peanuts are too greasy
 - c. The static electricity discharged
 - d. The balloon is too light

STATION 3

Hold a piece of steel wool in the tongs. Touch it against the 9 volt battery.

1. Why do you think the steel wool reacted the way it did?
2. In this case, the electricity was converted into (choose all that apply):
 - a. Light
 - b. Heat
 - c. Sound
 - d. Magnetism

STATION 4

1. Draw the wires to make this battery pack wired in series (on your answer sheet, not this sheet!) What is the total voltage?



1.5 volts



1.5 volts



1.5 volts

2. Draw the wires to make this battery pack wired in parallel (on your answer sheet, not this sheet!) What is the total voltage?



1.5 volts



1.5 volts



1.5 volts

(NCSCoS 4.3.07)

STATION 5

1. What is lightning?
 - a. Fire
 - b. Electricity discharging
 - c. Pollution
 - d. Light from Venus reflecting off swamp gas



2. What should you do if there is lightning near you?
 - a. Go indoors
 - b. Avoid open spaces and water
 - c. Stay away from metal structures like flagpoles
 - d. If you cannot get to safety, kneel down and cover your ears
 - e. All of the above

Lightning is essentially a giant circuit. The storm generates electricity, the lightning travels through the air, and strikes something, like a tree. Match the parts:

- | | |
|-------------------------|--------------|
| 3. Storm _____ | a. receiver |
| 4. Lightning bolt _____ | b. generator |
| 5. Tree _____ | c. conductor |

STATION 6

Place the alligator clips in solution 1. Do not let the alligator clips touch.

1. What happens?
 - a. The light turns on
 - b. It makes a sound
 - c. It sparks
 - d. Nothing

2. The liquid has become a part of your circuit. Does this mean it is a:
 - a. Conductor
 - b. Nonconductor

Place the alligator clips in solution 2. Do not let the alligator clips touch.

3. What happens?
 - a. The light turns on
 - b. It makes a sound
 - c. It sparks
 - d. Nothing

4. The liquid has become a part of your circuit. Does this mean it is a:
 - a. Conductor
 - b. Nonconductor

(NCSCoS 4.3.06)

STATION 7

Connect the wire ends to the battery leads. Try to pick up the ball by touching it to the head of the nail. Unhook the wire when you are done.



Fill in the blank:

An ___(1)___ is a type of ___(2)___ in which the magnetic ___(3)___ is produced by the flow of electric ___(4)___ . The magnetic field disappears when the current ___(5)___ .

Word Bank:

Current

Electromagnet

Field

Magnet

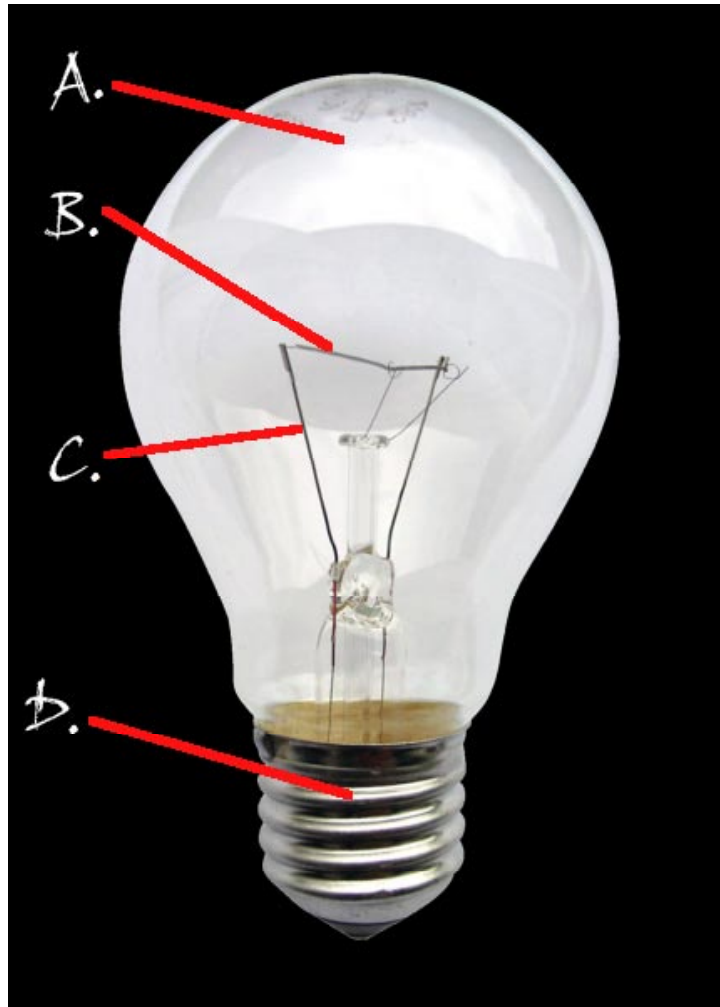
Stops

STATION 8

Matching:

1. Conductor
 2. Receiver
 3. Volt
 4. Electricity
- a. A form of energy caused by particles that carry a charge
 - b. Measures electric potential
 - c. A material that allows the flow of electric current.
 - d. A material that accepts electricity and converts it into something.

STATION 9



Identify (You will use the letters more than once, choose all that apply):

1. Base
2. Conductor
3. Filament
4. Resistor
5. Bulb
6. Insulator

(NCSCoS 4.3.05)

STATION 10



Use the multimeter to identify if the following items conduct or not:
C = Conductor N = Nonconductor

1. Iron Nail _____
2. Steel Ball Bearing _____
3. Sand _____
4. Styrofoam cup _____
5. Metal Scissors _____

2010 Short Circuits

NCSO Sample Event- Student Response Sheet

Names: _____ , _____

School: _____

Station 1:

1. _____
2. _____
3. _____
4. _____

Station 2:

1. _____
2. _____
3. _____
4. _____

Station 3:

1. _____
2. _____

Station 4:



1. _____



2. _____

Station 5:

1. _____
2. _____
3. _____
4. _____
5. _____

Station 6:

1. _____
2. _____
3. _____
4. _____

Station 7:

1. _____
2. _____
3. _____
4. _____
5. _____

Station 8:

1. _____
2. _____
3. _____
4. _____

Station 9:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Station 10:

1. _____
2. _____
3. _____
4. _____
5. _____

2010 Short Circuits

NCSO Sample Event- Student Response Sheet

ANSWER KEY

Station 1:

1. C
2. A
3. B
4. A

Station 2:

1. D
2. THEY STICK
3. THEY FALL
4. C

Station 3:

1. IT CAUSED A SHORT CIRCUIT
2. A, B

Station 4:



1. 4.5 VOLTS



2. 1.5 VOLTS

Station 5:

1. B
2. E
3. B
4. C
5. A

Station 6:

1. A
2. A
3. D
4. B

Station 7:

1. ELECTROMAGNET
2. MAGNET
3. FIELD
4. CURRENT
5. STOPS

Station 8:

1. C
2. D
3. B
4. A

Station 9:

1. D
2. D,C
3. B
4. B
5. A
6. A

Station 10:

1. C
2. C
3. N
4. N
5. C